

**PREDICTION OF FUNCTIONAL ACTIVITY IN POST-STROKE PATIENTS-
TERTIARY CARE HOSPITAL**

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ABSTRACT

The present study was conducted to assess the functional activity in post-stroke patients. Functional activity is a major complication in post-stroke patients. The severity of decreased functional activity depends upon the severity of stroke. The NIH severity is categorized by using NIHSS scale and the results based on those categories are no stroke 0%, mild(1-4) 6%, moderate(5-15) 37%, moderate to severe(16-20) 20% and severe(21-42) 37% and the functional activity is measured by using FIM(functional independence measurement) index in 3 stages Admission, Discharge, Follow-up, Helper complete dependence(<25 to 25% or more)- Admission 56%, Discharge 10%, Follow-up 8%, Helper modified dependence(50% or more to 100%)- Admission 39%, Discharge 5%, Follow-up 6%. No helper- Admission 5%, Discharge 85%, Follow-up 86%. Pearson correlation is performed in between the 3 stages of FIM and Post stroke patients the conclusion obtained from those results is Admission- negative correlation of -0.425 with P- value <0.0001, Discharge-negative correlation of -0.088, Follow-up – negative correlation of -0.250.

KEYWORDS: NIHSS, FIM, Post-stroke, Pearson correlation.

INTRODUCTION

The sudden death of brain cells due to lack of oxygen, caused by blockage of blood flow or rupture of an artery to the brain. Generally, stroke is of two types- ischaemic stroke and haemorrhagic stroke.^[1] According to the India stroke factsheet updated in 2012, the estimated age-adjusted prevalence rate for stroke ranges between 84/100,000 and 262/100,000 in rural and between 334/100,000 and 424/100,000 in urban areas.^[2]

Signs and Symptoms

Signs and symptoms of stroke can be explained by using 5s's.

- Sudden numbness or weakness of face, arm, or leg, especially on one side of the body
- Sudden confusion, trouble speaking or understanding speech.
- Sudden trouble seeing in one or both eyes.
- Sudden trouble walking, dizziness, loss of balance or coordination.
- Sudden severe headache with no known cause.^[3]

Risk factors

High blood pressure, smoking, Diabetes, High cholesterol, Transient ischaemic attacks, Atrial

fibrillation, certain blood disorders, excessive alcohol intake, illegal drug usage and several risk factors that are unavoidable or changed are Age, Gender, Heredity and Race, Prior stroke.^{[4][5]}

Diagnosis of stroke is based on the patient's condition and their signs and symptoms along with CT and MRI scans to Confirm and to know the progression of stroke.^[6]

Treatment: The goals of treatment for acute stroke are-

1. To reduce the ongoing neurologic injury and to decrease mortality and long-term disability.
2. Prevent complications secondary to immobility and neurologic dysfunction.
3. Prevent stroke recurrence.

Medications that are given to the ischaemic and haemorrhagic stroke are

- Tissue plasminogen activator- Alteplase is given to manage acute ischaemic stroke and is given to the patients who are brought to the emergency department within 3-4.5 hours
- Aspirin
- Clopidogrel

- Ticlopidine
- Warfarin
- Nimodipine
- Heparin for DVT prophylaxis.

These are the medication that are widely used in treating stroke.

There are other methods in treating a stroke

- Endovascular procedures- Now a day’s endovascular procedures are widely used to take out the major clots that is present in the blood vessels.
- Surgical Treatment.^[7]

Functional Outcome: Functional outcomes define results of care focused on the patient’s physical ability. When patients receive rehabilitative services, they are likely concerned about results that matter to them. Sharing typical results with them helps set realistic expectations.

Outcome measurement tools

- The timed up and go test
- The Tinetti balance and gait evaluation
- The Berg balance scale
- The functional independent measure
- The six-minute walk test
- The functional reach test
- The Oswestry low back pain disability questionnaire.^[10]

MATERIALS AND METHODS

This Prospective Cohort study was conducted in Guntur government hospital (GGH), Andhra Pradesh, INDIA for a period of 6 months with the help of department of neurology, Guntur government hospital. Post- stroke patients were taken from neurology department of GGH where they were assessed by using stroke scale and Functional independence measure.

Procedure: Nearly 100 patients who are diagnosed as stroke are taken into consideration and they were first assessed by using NIHSS scale which is a stroke severity assessment scale, stroke severity in each patient was assessed according to the scores. FIM Index (Functional independence measure) is used to measure the functional outcome in the post stroke patients this a set of 18 questions which are filled by the researcher by observing and analysing the patient. After completing the assessment correlation is checked in between the stroke and Functional outcome of the patient this is done by

using the score obtained from their respective scale and applying Pearson correlation to them.

RESULTS

100 patients met the inclusion criteria and were included in the study; 45 subjects were excluded from the study due to death(n=33) and comatization of patients (n=9), the data obtained were tabulated and analysed. The patients were distributed within the age groups 35-90 years. The majority of patients were in between 57- 67 years (36%). Our study also finds the association between Gender and Type of stroke in which Haemorrhagic stroke in Male 12(20.33%), Ischaemic stroke in Male 42(71.18%) were majorly observed.

We found out the Stroke **severity** in the subjects by using NIH scale out of 100 subjects no moderate 37 (37%), moderate to severe 20(20%), severe 37(37%). **Functional outcome** of the patient was measured using FIM index and the 100 subjects were categorised as Helper complete dependence (<25% to 25% or more) admission 56 (56%), discharge 10(10%), follow up 8(8%), Helper modified dependence (50% or more to 100%) admission 39(39%), discharge 5(5%), follow up 6(6%), No helper admission 5(5%), discharge 85(85%) follow up 86(86%). In our study when Pearson correlation is done in between the stroke and functional outcome of the patient during admission, the correlation that is observed is a negative correlation with a value of -0.425 and the correlation is significant at the 0.01 level (2-tailed) (P-value <=0.0001) and similarly the correlation is done in between the stroke and functional outcome of the patient during discharge and those values are slightly different than of during admission that is there is a negative correlation(-0.88) in between the stroke and functional outcome during discharge (P-value 0.385) and correlation between stroke and functional outcome of patients during follow-up there is a negative correlation (-0.116) in between the stroke and functional outcome of the patient during follow-up.

Table 1: Age Vs FIM(Admission)

Table 1 depicts the information regarding age and FIM (functional independence measure) admission. Under category HELPER Complete dependence, majority of patients are under 56- to 76-year-old followed by 35 to 55 years old and then above 76 years. Under category HELPER Modified dependence, most of the patients are under 35 to 55 years old followed by 56–76-year-old and then above 76 years. There are no patients admitted under NO HELPER category.

Age(years)	FIM(A) HELPER Complete dependence	FIM(A) HELPER Modified dependence	FIM(A) NO HELPER
35-55	41	4	0
56-76	46	3	0
>76	3	3	0

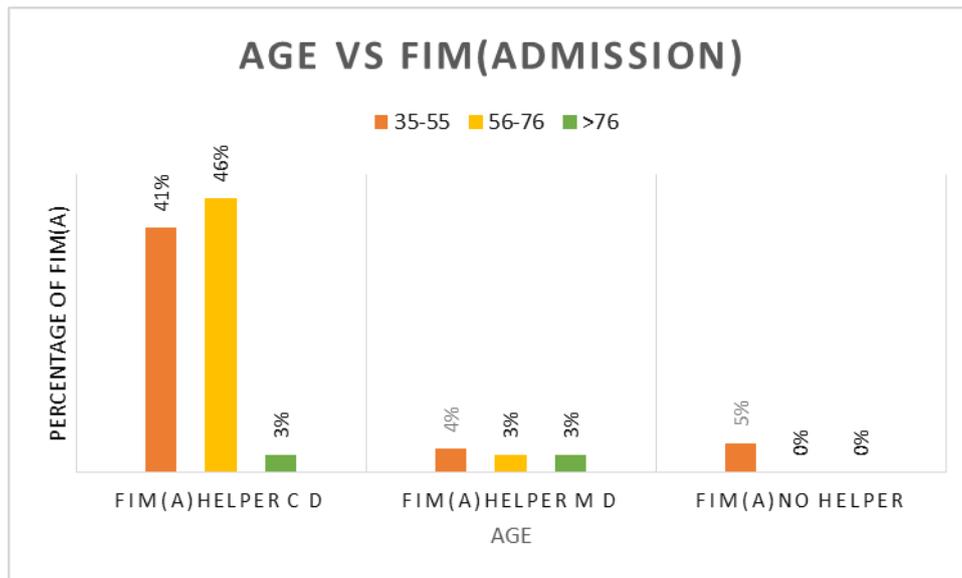


Fig.1 Age Vs FIM(Admission)

Table 2: Age Vs FIM(Discharge)

Table 2 depicts the information regarding age and FIM (functional independence measure) discharge. Under category HELPER Complete dependence, majority of patients are under 56- to 76-year-old followed by 35 to 55 years old and then above 76 years. Under category

HELPER Modified dependence, most of the patients are under 35 to 55 years old followed by 56–76-year-old and then above 76 years. Under NO HELPER category, most of the patients are in 35- to 55-year-old and 56- to 76-year-old and then above 76 years.

Age(years)	FIM(D) HELPER Complete dependence	FIM(D) HELPER Modified dependence	FIM(D) NO HELPER
35-55	5	34	6
56-76	11	32	6
>76	0	2	4

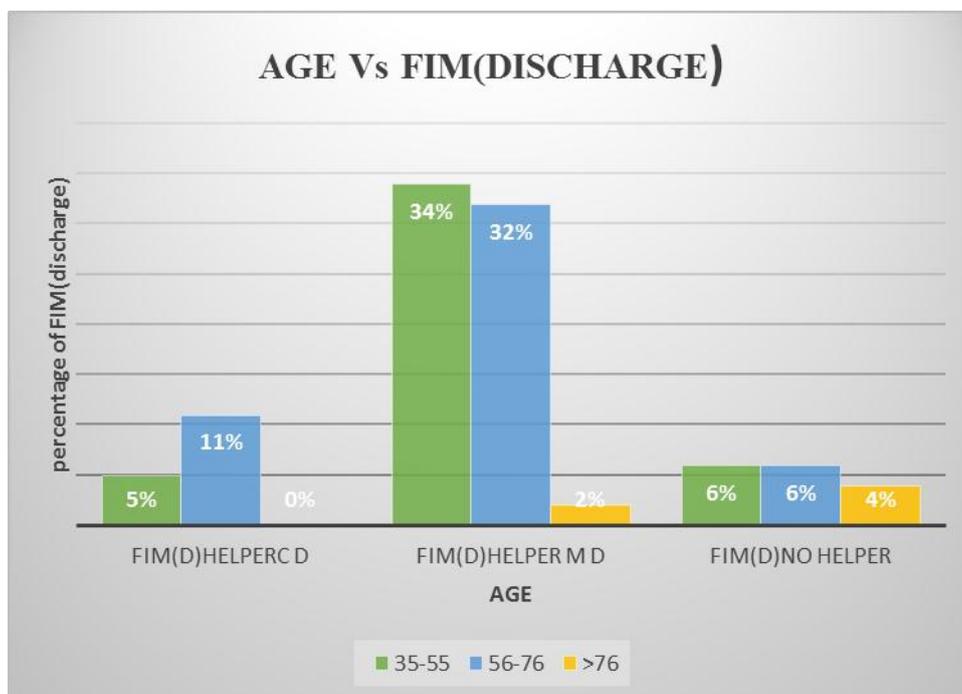


Fig 2: Age Vs FIM (Discharge)

Table 3: Age Vs FIM (Follow up)

Table 3 depicts the information regarding age and FIM (functional independence measure) follow up. Under category HELPER Complete dependence, majority of patients are under 56- to 76-year-old followed by 35 to 55 years old and then above 76 years. Under category

HELPER Modified dependence, most of the patients are under 35 to 55 years old followed by 56–76-year-old and then above 76 years. Under NO HELPER category, most of the patients are in 56 to 76-year-old followed by 35- to 55-year-old and then above 76 years.

Age(years)	FIM(F) HELPER Complete dependence	FIM(F) HELPER Modified dependence	FIM(F) NO HELPER
35-55	5	33	7
56-76	10	31	8
>76	0	3	3

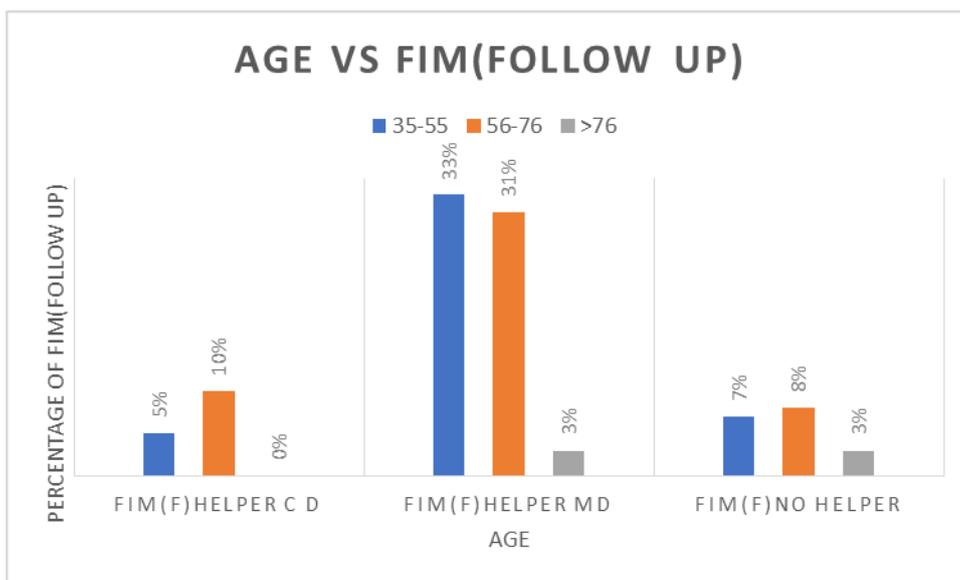


Table 4: GENDER Vs FIM(ADMISSION)

Table 4 depicts the information regarding gender and FIM (functional independence measure) admission. Under category HELPER Complete dependence, majority of patients are male and then followed by

female. Under category HELPER Modified dependence, most of the patients are male and then followed by female. There are no patients admitted under NO HELPER category.

GENDER	FIM(A) HELPER Complete dependence	FIM(A) HELPER Modified dependence	FIM(A) NO HELPER
MALE (59)	51	8	0
FEMALE (41)	40	1	0

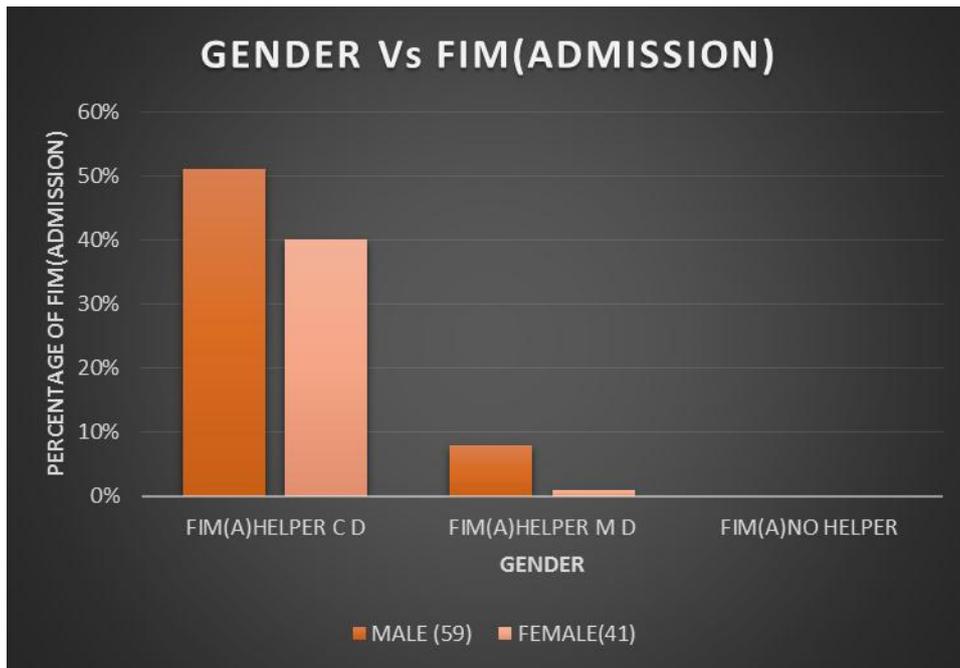


Fig 4: GENDER Vs FIM(ADMISSION)

Table 5: GENDER Vs FIM(DISCHARGE)

Table 5 depicts the information regarding gender and FIM (functional independence measure) discharge. Under category HELPER Complete dependence, majority of patients are male and then followed by

female. Under category HELPER Modified dependence, most of the patients are male and then followed by female. Under NO HELPER category, most of the patients are male and then followed by female.

GENDER	FIM(D) HELPER Complete dependence	FIM(D) HELPER Modified dependence	FIM(D) NO HELPER
MALE (59)	12	36	11
FEMALE (41)	4	32	5

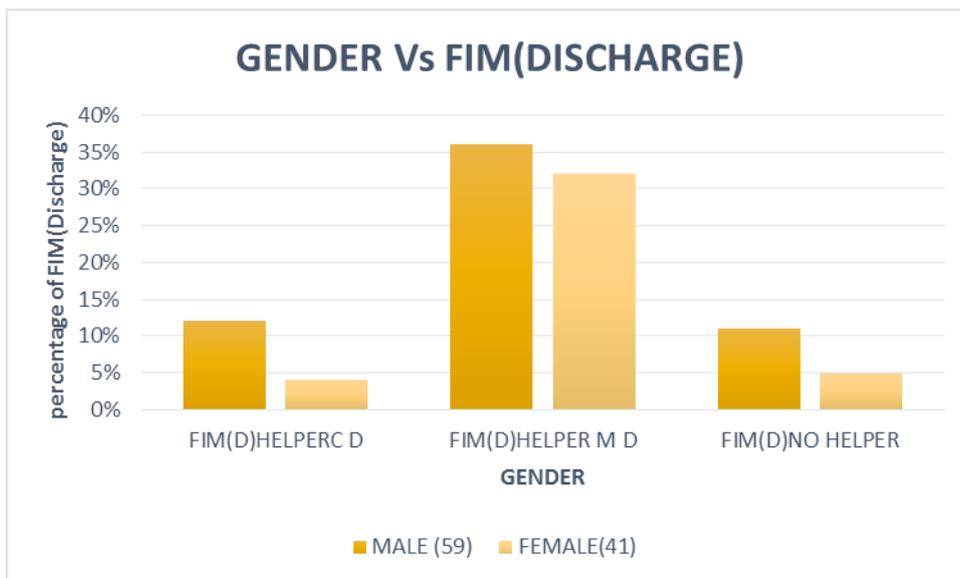


Fig.5: GENDER Vs FIM (DISCHARGE)

Table 6: GENDER Vs FIM (FOLLOW UP)

Table 6 depicts the information regarding gender and FIM (functional independence measure) follow up.

Under category HELPER Complete dependence, majority of patients are male and then followed by female. Under category HELPER Modified dependence,

most of the patients are male and then followed by female. Under NO HELPER category, most of the patients are male and then followed by female.

GENDER	FIM(F) HELPER Complete dependence	FIM(F) HELPER Modified dependence	FIM(F) NO HELPER
MALE (59)	11	35	13
FEMALE (41)	4	32	5

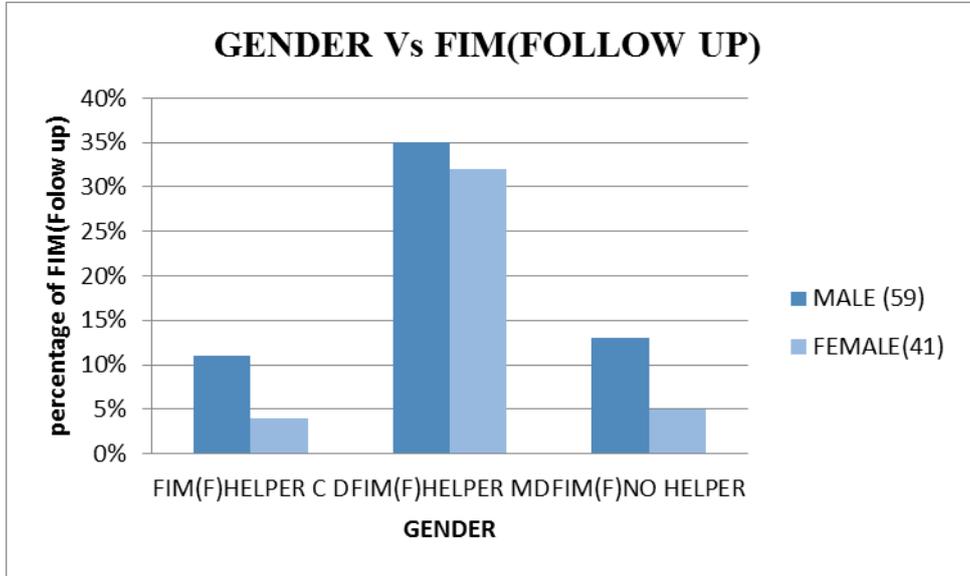


Fig.6: GENDER Vs FIM (FOLLOW UP)

Table 7: Gender Vs Type of stroke

Table 7 depicts the information regarding type of stroke in males and females. Majority of male patients were diagnosed with Ischemic stroke (71.18%), followed by Haemorrhagic stroke (20.33%) and PC stroke (8.47%).

Most of the female patients were diagnosed with Ischemic stroke (73.17%), followed by Haemorrhagic stroke (17.07%) and PC stroke (9.75%) which was graphically resented in fig.4

Type of stroke	Male	Female
Haemorrhagic stroke	12(20.33%)	7(17.07%)
Ischemic stroke	42(71.18%)	30(73.17%)
PC stroke (posterior circulation stroke)	5(8.47%)	4(9.75%)

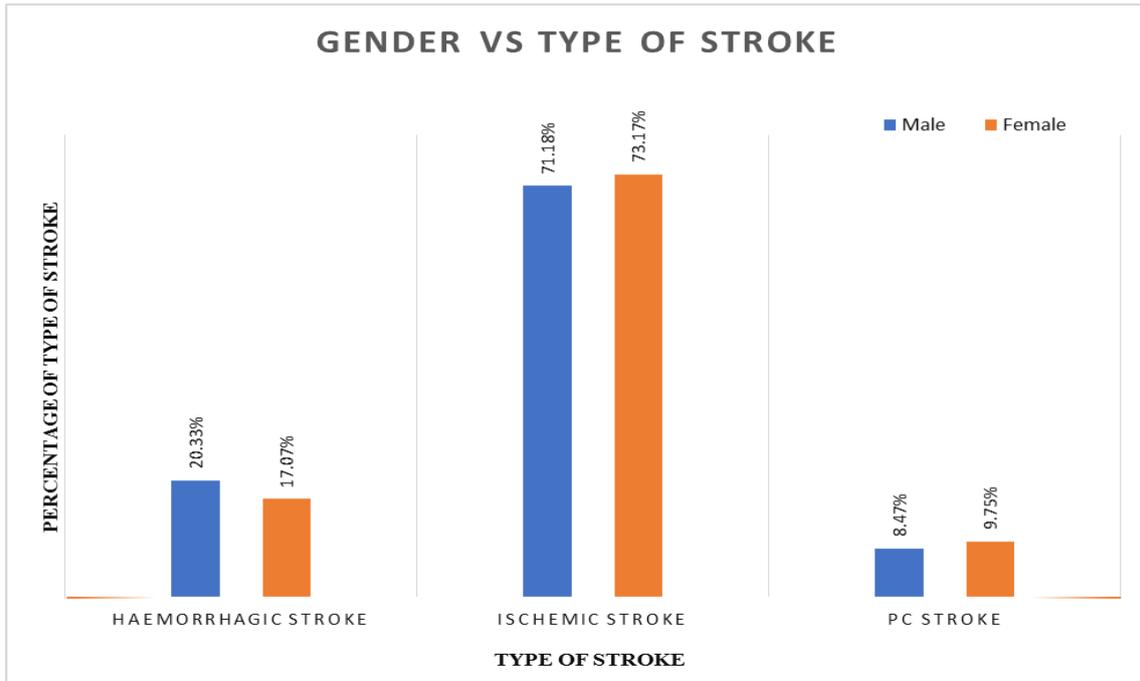


Fig.7 Gender Vs Type of stroke.

Table 8: Age Vs Number of Subjects

Table 8 depicts the information regarding distribution of patients within age groups of 35 to above 78 years. Majority of patients were found within 57 -67 years

(36.00%), followed by 68-78 years (23.00%), 35-45 years (21.00%), 46-56 years (17.00%) and above 78 years (3.00%) which was graphically represented in fig.5

AGE OF THE SUBJECT	NUMBER OF PATIENTS(N=100)
35-45	21(21.00%)
46-56	17(17.00%)
57-67	36(36.00%)
68-78	23(23.00%)
<78	3(3.00%)

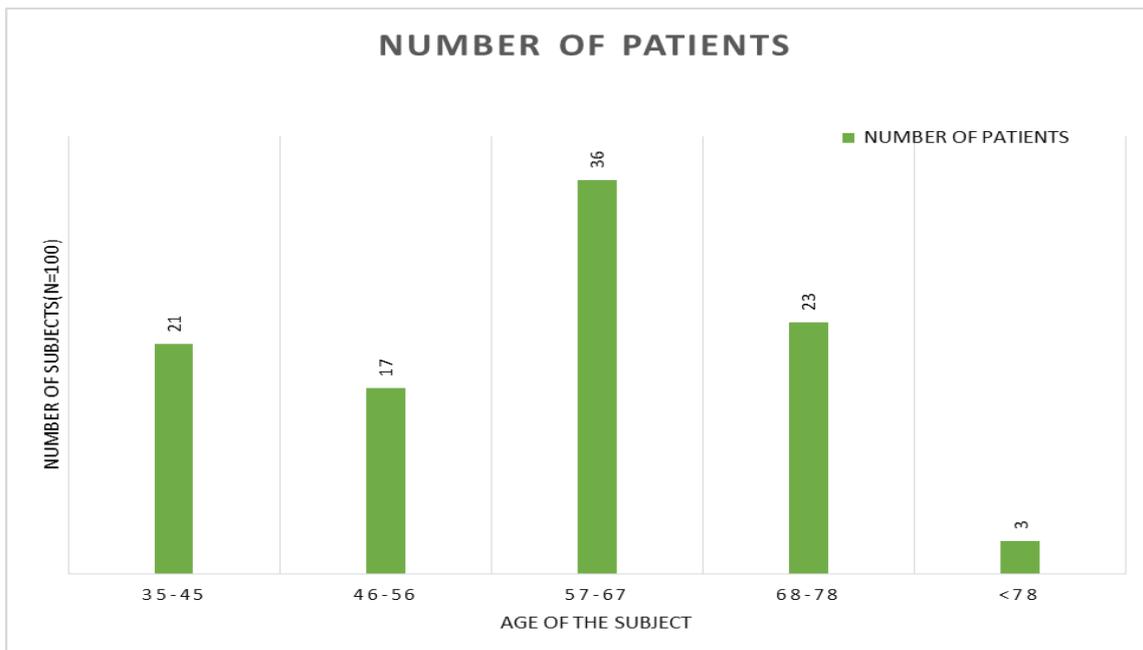


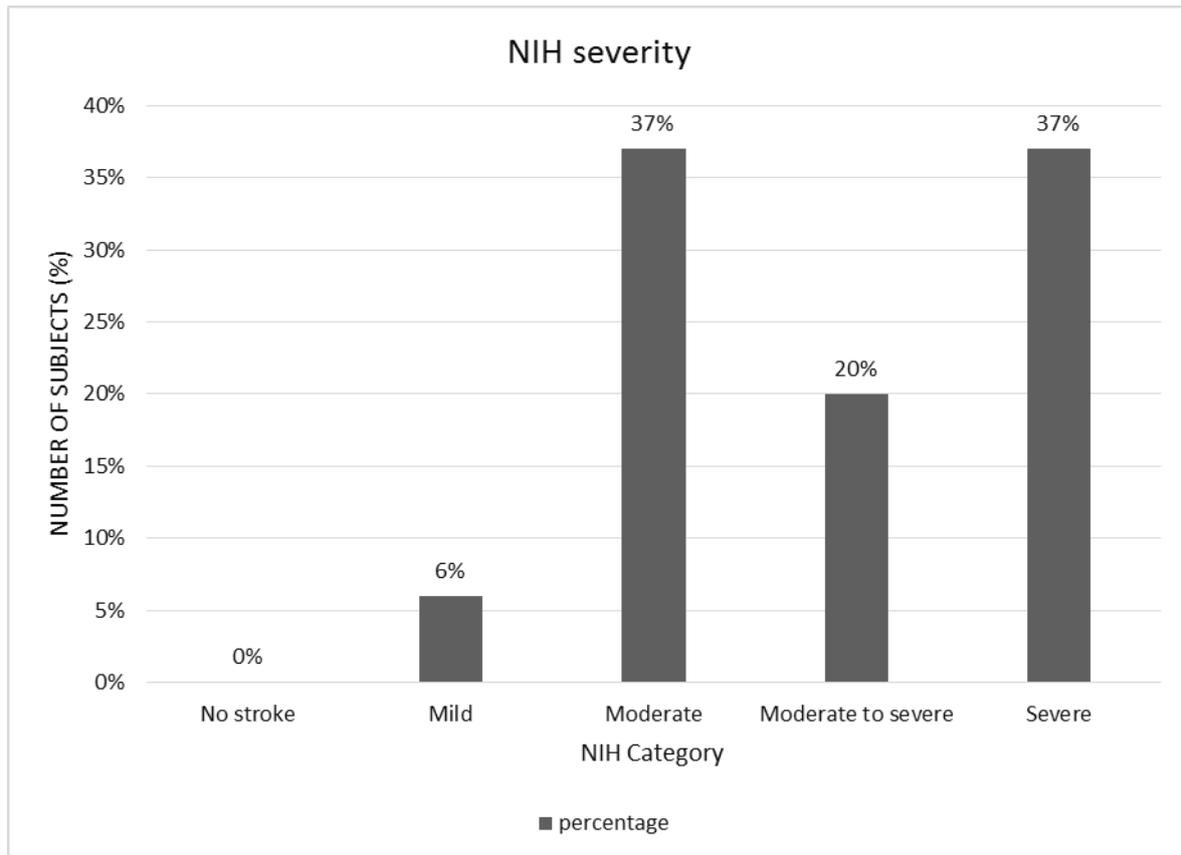
Fig.8 Age Vs Number of patients.

Table 9: NIH severity in Post stroke patients

Table 9 depicts the information regarding categorization of NIH scale and number of subjects in each category. Majority of subjects were in moderate (37%) and severe

(37%), followed by moderate to severe (20%), mild (6%) and no stroke (0%) which was graphically represented in fig.6.

CATEGORY OF NIH	SCORE	NUMBER OF SUBJECTS(N=100)
NO STROKE	0	0(0%)
MILD	1-4	6(6%)
MODERATE	5-15	37(37%)
MODERATE TO SEVERE	16-20	20(20%)
SEVERE	21-42	37(37%)

**Fig.9 Stroke severity.****Table 10: Correlation in between NIH and FIM admission.**

Correlations			
		STROKE	FIM
STROKE	Pearson Correlation	1	-.425**
	Sig. (2-tailed)		.000
	N	100	100
FIM	Pearson Correlation	-.425**	1
	Sig. (2-tailed)	.000	
	N	100	100

** . Correlation is significant at the 0.01 level (2-tailed).

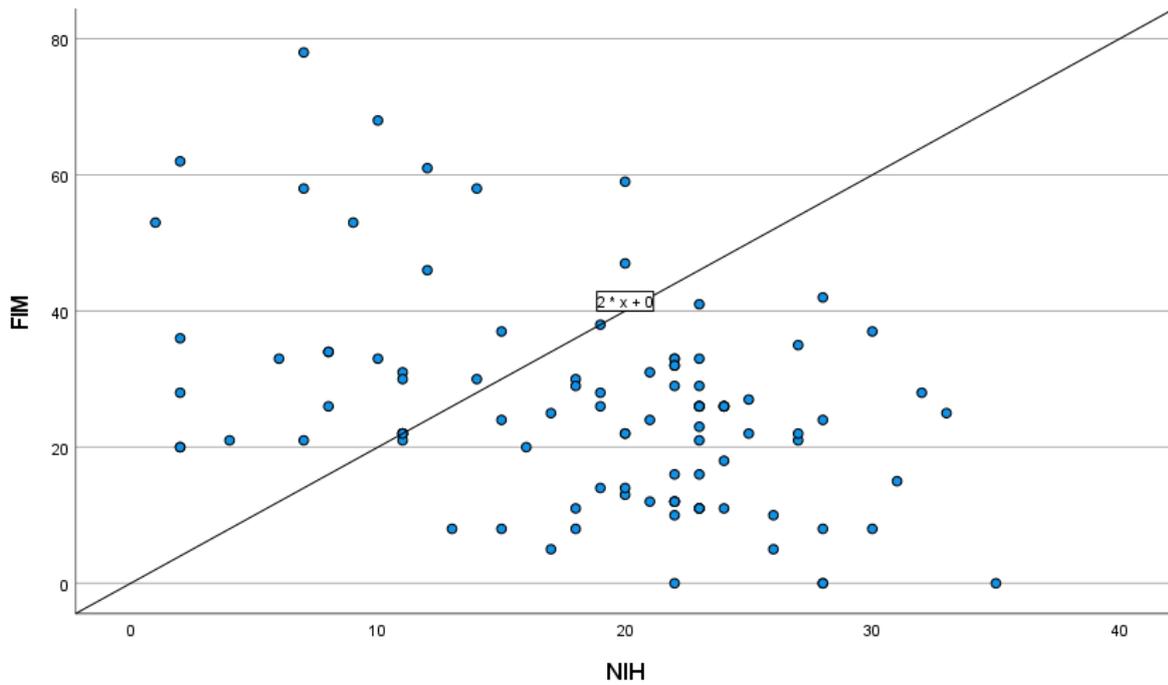


Figure 10: Scatter plot between Stroke and FIM admission.

Table 11: Correlation in between NIH and FIM discharge.

		STROKE	FIM
STROKE	Pearson Correlation	1	-.088
	Sig. (2-tailed)		.385
	N	100	100
FIM	Pearson Correlation	-.088	1
	Sig. (2-tailed)	.385	
	N	100	100

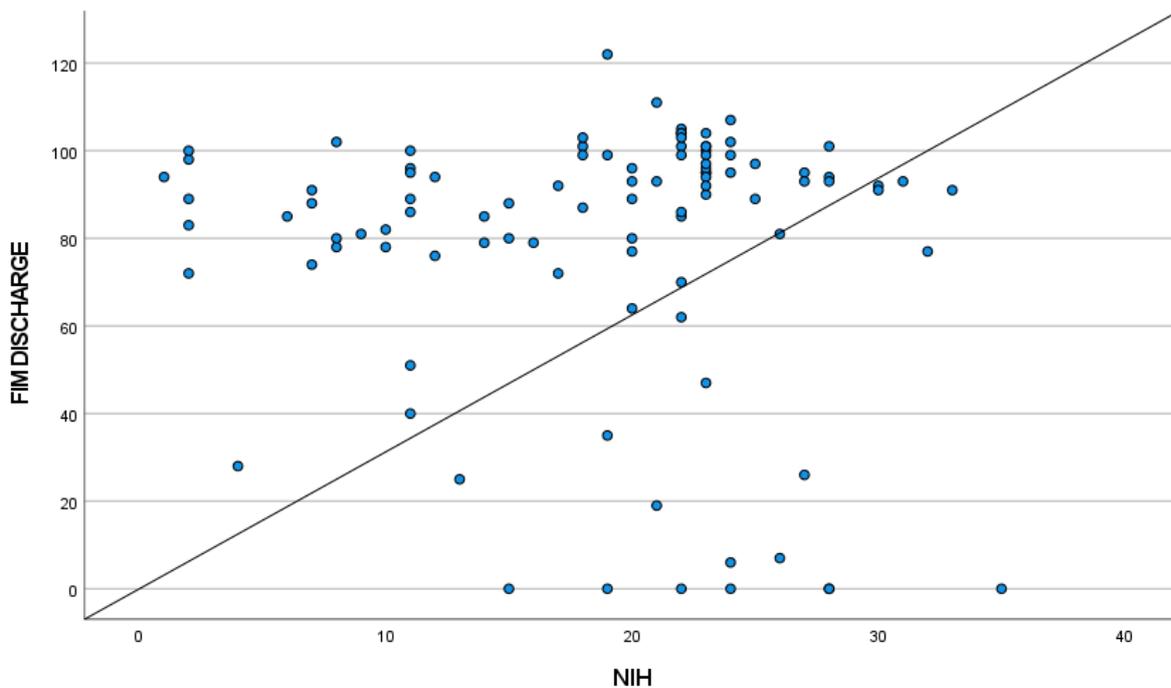


Figure 11: Scatter plot between Stroke and FIM discharge.

Table 12: Correlation in between Stroke and FIM Follow up.

		STROKE	FIM
STROKE	Pearson Correlation	1	-.116
	Sig. (2-tailed)		.250
	N	100	100
FIM	Pearson Correlation	-.116	1
	Sig. (2-tailed)	.250	
	N	100	100

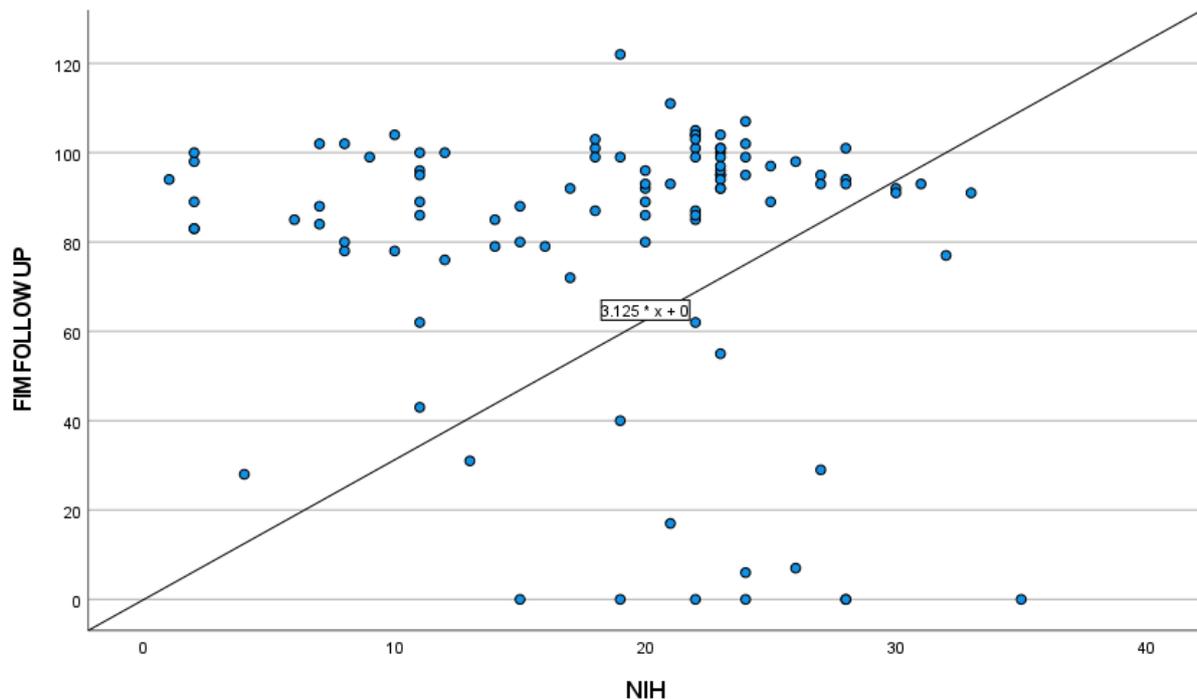


Figure 12: Scatter plot between Stroke and FIM follow up.

DISCUSSION

A non-experimental prospective cohort study was carried out on – ASSESSMENT OF DEPRESSION AND FUNCTIONAL OUTCOMES IN POST STROKE PATIENTS AND EFFECTS OF PATIENT COUNSELLING IN A TERTIARY CARE HOSPITAL. 100 patients met the inclusion criteria and were included in the study; 45 subjects were excluded from the study due to death (n=33) and comatization of patients (n=9), the data obtained were tabulated and analysed. The patients were distributed within the age groups 35-90 years. The majority of patients were in between 57- 67 years (36%) followed by 68-78 years (23%), 35-45 years (21%), **Functional outcome** of the patient was measured using FIM index and the 100 subjects were categorised as Helper complete dependence (<25% to 25% or more) admission 56 (56%), discharge 10(10%), follow up 8(8%), Helper modified dependence (50% or more to 100%) admission 39(39%), discharge 5(5%), follow up 6(6%), No helper admission 5(5%), discharge 85(85%) follow up 86(86%) These findings were similar to study done by **Maree L. Hackett, et.al** stroke 5 may 2005, stroke, 2005; 1330-1340 conducted a study on “Frequency of depression after stroke”.

In our study when Pearson correlation is done in between the stroke and functional outcome of the patient during admission, the correlation that is observed is a negative correlation with a value of -0.425 and the correlation is significant at the 0.01 level (2-tailed) (P-value <=0.0001) and similarly the correlation is done in between the stroke and functional outcome of the patient during discharge and those values are slightly different than of during admission that is there is a negative correlation(-0.88) in between the stroke and functional outcome during discharge (P-value 0.385) and correlation between stroke and functional outcome of patients during follow-up there is a negative correlation (-0.116) in between the stroke and functional outcome of the patient during follow-up.

From the above correlation between stroke severity and functional outcomes in post stroke patients, we found that Stroke patients have lower functional scores during admission and discharge time when compared to follow up period (6 months). These results were similar to study done by **F B can de Weg et al** Clin Rehabil. 1999 June. 13(3): 268-72. conducted a study on “Post stroke depression and functional outcome: a cohort study

investigating the influence of depression on functional recovery from stroke”.

CONCLUSION

Based on the results obtained in the study we conducted in the post stroke patients. The functional outcome of the patients is also measured in the post stroke patients which lead to result of negative correlation in between stroke and functional outcome of the patient that is with the increase in severity of stroke the patient's functional outcome is decreased. The negative correlation value is -0.425. ($P < 0.0001$)

Based on the results obtained our study strongly concludes that functional outcome of the patient is decreased which led to bed ridden of patients during admission and discharge phase but after follow up patient counselling to patient with the help of leaflet and also increase in functional outcomes i.e. No Helper category patients were 86%.so, we conclude that through proper patient counselling and physiotherapy the patients can regain their health.

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REFERENCES

1. Definition of Stroke [Internet]. Medicinenet.com. [cited 2021 Jan 2]. Available from: <https://www.medicinenet.com/stroke/definition.html>
2. Sancd.org. [cited 2021 Jan 2]. Available from: <http://www.sancd.org/Updated%20Stroke%20Fact%20sheet%202012.pdf>.
3. Stroke Symptoms [Internet]. Stroke.org. [cited 2021 Jan 3]. Available from: <https://www.stroke.org/en/about-stroke/stroke-symptoms>
4. Stroke.org. [cited 2021 Jan 3]. Available from: https://www.stroke.org/-/media/strokefiles/lets-talk-about-stroke/risk-factors/lets-talk-about-risk-factors-for-strokeucm_309713.pdf?la=e.
5. Diabetes [Internet]. Org.uk. 2015 [cited 2021 Jan 3]. Available from: <https://www.stroke.org.uk/what-is-stroke/are-you-at-risk-of-stroke/diabetes>.
6. Radiological Society of North America (RSNA), American College of Radiology (ACR). Stroke [Internet]. Radiologyinfo.org. [cited 2021 Jan 3]. Available from: <https://www.radiologyinfo.org/en/info.cfm?pg=stroke>
7. Joseph T. Dipiro Robert L. Talbert Gary C. Yees. pharmacotherapy a pathophysiological approach. New York, NY: McGraw-Hill; 2005.Diagnosis of stroke. Page no: 418.
8. Complications After Stroke [Internet]. Cooperhealth.org. [cited 2021 Jan 3]. Available from: <https://www.cooperhealth.org/services/stroke-program/complications-after-stroke>.
9. Stroke.org. [cited 2021 Jan 3]. Available from: https://www.stroke.org/-/media/strokefiles/lets-talk-about-stroke/life-after-stroke/lta_complications-after-stroke.pdf?la=e.
10. Brett Sears PT. Outcome measurement tools in physical therapy [Internet]. Verywellhealth.com. [cited 2021 Oct 11]. Available from: <https://www.verywellhealth.com/outcome-measurement-tools-2696083>
11. Researchgate.net. [cited 2021 Jan 2]. Available from: https://www.researchgate.net/publication/269390689_The_effect_of_post_stroke_depression_on_functional_outcome_and_quality_of_life
12. Hackett ML, Yapa C, Parag V, Anderson CS. Frequency of depression after stroke: a systematic review of observational studies: A systematic review of observational studies. *Stroke*, 2005; 36(6): 1330–40.
13. Kogan E, Twyman K, Heap J, Milentijevic D, Lin JH, Alberts M. Assessing stroke severity using electronic health record data: a machine learning approach. *BMC Med Inform Decis Mak*, 2020; 20(1): 8.